

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Currently Amended) A method for retaining a treatment chemical in a subterranean formation containing hydrocarbons, the method comprising:
 - (a) preparing an emulsion including:
 - (i) an oil continuous phase;
 - (ii) a first aqueous phase including a first treatment chemical which is to be retained in a subterranean formation; and
 - (iii) a second aqueous phase including a second chemical which is to be reacted with the first treatment chemical in the subterranean formation to enhance retention of the treatment chemical in the subterranean formation;wherein the first and second aqueous phases remain generally separately dispersed and stable within the oil continuous phase;
 - (b) placing the emulsion down a well bore and into the subterranean formation; and

(c) allowing the first and second aqueous phases to interact with one another in the subterranean formation such that the first treatment chemical and the second chemical ~~react~~ are prepared and mixed with one another resulting in the first treatment chemical securing to the subterranean formation.

2. (Original) The method of Claim 1 wherein:

the oil continuous phase includes at least one surfactant which aids in the formation of the oil continuous emulsion.

3. (Original) The method of Claim 2 wherein:

the surfactant includes one of an anionic surfactant and a non-ionic surfactant.

4. (Original) The method of Claim 1 wherein:

the oil continuous phase and the first and second aqueous phases separate or invert within the subterranean formation to enhance the rate of reaction between the first and second aqueous phases.

5. (Original) The method of Claim 4 wherein:

the subterranean formation contains fluids including hydrocarbons and water and the water in the subterranean formation assists in the inversion of the emulsion from an oil continuous phase to a water continuous phase.

6. (Original) The method of Claim 4 wherein:

the emulsion receives heat from the subterranean formation which enhances the inversion of the emulsion from an oil continuous phase to a water continuous phase.

7. (Original) The method of Claim 4 wherein:

the inversion of the emulsion from an oil continuous phase to a water continuous phase is enhanced by the presence of salt in the subterranean formation which increases the salinity or ionic strength of the aqueous phase.

8. (Currently Amended) The method of Claim 4 wherein:

the step of inverting the oil continuous phase and the first and second aqueous phases is enhanced by an inclusion of a ~~delayed release agent~~ retention enhancing chemical in the emulsion which will alter the pH of the emulsion as the emulsion warms.

9. (Currently Amended) The method of Claim 8 wherein:

the ~~delayed release agent~~ retention enhancing chemical is sulfamic acid.

10. (Original) The method of Claim 1 wherein:

the first aqueous phase and the second aqueous phase are prepared as separate oil continuous emulsions prior to their being mixed together to form the oil continuous emulsions prior to their being mixed together to form the oil

continuous emulsion which is placed down the well bore and into the subterranean formation.

11. (Original) The method of Claim 1 wherein:

the first treatment chemical includes at least one of a scale inhibitor, a proppant, a polymer and a conformance controller.

12. (Original) The method of Claim 1 wherein:

the first treatment chemical includes a scale inhibitor and the amount of active scale inhibitor is in the range of 0.5-35% wt./vol. of the first aqueous phase.

13. (Original) The method of Claim 12 wherein:

the amount of active scale inhibitor is in the range of 5-15% wt./vol. of the first aqueous phase.

14. (Original) The method of Claim 13 wherein:

the amount of active scale inhibitor is in the range of 5-10% wt./vol. of the first aqueous phase.

15. (Currently Amended) The method of Claim 1 wherein:

the first treatment chemical comprises a scale inhibitor which includes at least one of Nitrilo tri(methylene methylene phosphonic) acid Bis-hexamethylene triamine-penta(methylene phosphonic) acid, Poly(acrylic) acid, Diethylene triamine-penta(methylene phosphonic) acid, Phosphinopolycarboxylic acid,

Sulfonated polyacrylic acid, 1-Hydroxytheylidene-1,1-diphosphonic acid, and Hexamethylene diamine-tetra(methylene phosphonic) acid.

16. (Currently Amended) The method of Claim 1 wherein:

the first treatment chemical comprises a scale inhibitor including a combination of at least two of Nitrilo tri(methylene phosphonic) acid, Bis-hexamethylene triamine-penta(methylene ~~phosphonic~~ phosphonic) acid, Poly(acrylic) acid, Diethylene triamine-penta(methylene phosphonic) acid, Phosphinopolycarboxylic acid, Sulfonated polyacrylic acid, 1-Hydroxyethylidene-1,1-diphosphonic acid, and Hexamethylene diamine-tetra(methylene phosphonic) acid.

17. (Original) The method of Claim 1 wherein:

the first aqueous phase includes a solvent.

18. (Original) The method of Claim 1 wherein:

the second aqueous phase includes a solvent.

19. (Original) The method of Claim 1 wherein:

the retention enhancing agent includes at least one ion of Group II metals, Group III metals, and transition elements in an amount sufficient to react with the first treatment chemical.

20. (Original) The method of Claims 1 wherein:

the retention enhancing agent comprises one of metal hydroxide, metal oxide, metal alkoxide, and mixtures thereof, and wherein the metal is selected from the group comprising lithium, sodium, potassium, magnesium, calcium, strontium, barium, boron or mixtures thereof.

21. (Original) The method of Claim 1 wherein:

the molar ratio of the retention enhancing agent to the first treatment chemical is in the range of 0.5-20:1.

22. (Original) The method of Claim 21 wherein:

the molar ratio of the retention enhancing agent to the first treatment chemical is in the range of 0.1-10:1.

23. (Original) The method of Claim 22 wherein:

the molar ratio of the retention enhancing agent to the first treatment chemical is in the range of 0.5-5:1.

24. (Original) A method for retaining a treatment chemical in a subterranean formation, the method comprising:

(a) preparing an emulsion including:

(i) an oil continuous phase includes-at least one surfactant, capable of forming an oil continuous phase emulsion;

- (ii) a first aqueous phase including a first treatment chemical which is to be retained in a subterranean formation; and
 - (iii) a second aqueous phase including a second chemical which is to be reacted with the first chemical in the subterranean formation to enhance the retention of the first treatment chemical to the subterranean formation;
- (b) placing the emulsion down a well bore and into the subterranean formation; and
- (c) permitting the first and second chemicals in the aqueous phases to react for a sufficient period of time causing the first treatment chemical to be retained in the subterranean formation.